CETOS
Center for Ethics and Toxics
A Project of the Tides Center
39141 S. Highway One • P.O. Box 673
Gualala, California 95445
Phone 707-884-1700 • FAX 707-884-1846
Web site: www.cetos.org • email: cetos@cetos.org

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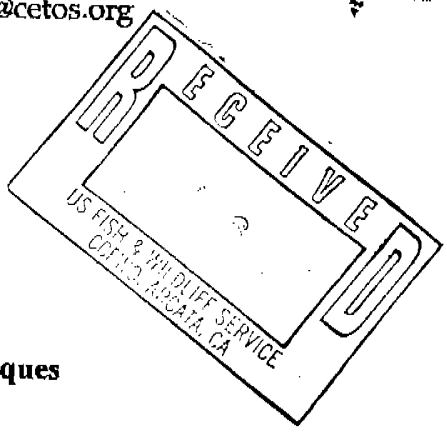

Critique of Risk Assessment Techniques

Used in the Sustained Yield Plan

I am the director of the Center for Ethics and Toxics and have served as a State health official in California, as the founder and chief of the Hazard Evaluation System. In that capacity, I am familiar with risk assessment techniques and the presentation of data to support projects requiring an environmental assessment or report. The proposed Draft EIR/EIS of the Pacific Lumber Sustained Yield Plan includes a description under items 3.14 et seq which purport to represent an assessment of the potential toxicity of herbicides in the planned uses.

This assessment provides a completely inadequate base on which to determine the existence or absence of environmental impacts arising from planned herbicide usage. Specifically, there is a dearth of references and an undue reliance on an extremely limited cross-section of scientific studies to vouchsafe the programmatic use of herbicides. The disucssion of herbicide toxicity (Sec 3.14.5.1) which declares that herbicide toxicity is limited to plants is a gross misrepresentation of the data on herbicides generally, and

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specific herbicides like 2,4 Dichlorophenoxyacetic acid and its salts (2,4 D) in particular. Even those herbicides which interact with photosynthetic pathways nonetheless have mammalian toxicity at high doses, interfering with microsomal enzymes such as mammalian monoxygenases.[1] These effects may be attributable to the surfactants or other inerts used in formulating these and other herbicides.

CET-1 CON.

The authors of the EIR/EIS for the Sustained Yield Plan provide a skeletal outline of herbicide toxicity assays, then neglect to provide an analysis of how those assays in fact play out when the proposed herbicides are tested. For instance, while the authors acknowledge the importance of measuring herbicide degradation and half life under various conditions, in discussing atrazine they cite only a representative study which alleges that atrazine "is not expected to migrate to groundwater under normal application conditions". This statement does not hold up to scrutiny—no mention is made of the literally dozens of studies which demonstrate the persistence and migration of atrazine throughout mid-Western aquifers and resulting destruction of potable water systems. The statement that atrazine's "main toxic effect" is related to photosynthesis completely ignores cancer bioassay data and chronic feeding studies which demonstrate systemic pathology. Moreover, to cite just one workplace study review (by Brusick, et al 1966) to establish the absence of worker health effects, when that study dealt with cancer risks and mortality and not more subtle health effects, is a serious oversight.

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The risk assessment also omits several key parameters which are essential to determine ecological impact: 1) no mention of non-target mammalian species who may consume contaminated vegetation; 2) no discussion of the low-level toxic effects on

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[1] See E. Hietanen, et al, "Effects of phenoxyherbicides and glyphosate on the hepatic and intestinal

aquatic organisms on the food chain (e.g., tadpoles affected at 20 ppb by atrazine); 3) no discussion on the impact of herbicide residues such as Garlon 4 mixtures on salmonids, including the endangered Coho salmon;[2] 4) no discussion of human ingestion, eg from berry picking; 5) no discussion of the impact to microbial and micorhyzzial communities; 6) no worker risk estimates; and 7) no presentation of Hazard Indices to permit an overall risk determination.

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Item 5) is particularly crucial, since recent studies have shown that the diversity of surviving mycorrhizal fungi are directly linked to the ultimate grow-back of disturbed (i.e., logged) ecosystems.[3] Many of the proposed herbicides have selective toxicity for fungal species. No such impacts are mentioned.

CET-7 CON.

In the instance of 7) above, the risk assessment fails to provide a numerical basis for determining dosages, routes of likely contamination and exposure; and ultimate fate of the particular herbicides alone or in combination with their inert vehicles. Rather than providing uninformative subjective assurances of "no effect" based on the "likelihood" that a given herbicide will not migrate, will not persist, or will not be toxic, etc, it is incumbent on the risk assessor to determine the actual probabilities for such behavior based on

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biotransformation activities in the rat, " Acta Pharmacol. Toxicol 53: 103-112, 1983.

[2] Mention of the Wan et al report of 1987 which showed "slight toxicity" at 1.4 mg/liter is both an understatement and ignores other studies which demonstrate effects below 1 ppm on swimming behavior. The 1991 Wan et al study concluded that Garlon 4 formulations of triclopyr were highly toxic to salmonids (See MT Wan et al, "Acute toxicity to juvenile Pacific Northwest salmonids of Bascid Blue NB 755 and its mixture with formulated products of 2,4 D, glyphosate and triclopyr," Bulletin of Environmental Contamination and Toxciology 47: 471-478, 1991. Low dose toxicity for triclopyr was see by JA Johansen and GH Green, "Sublethal and acute toxicity of the ehtylene glycol butyl ether ester forumulation of triclopyr to juvenile Coho salmon," Archives of Environmental Contamination and Toxicicology 19: 610-616, 1990.

[3] See MGA van der Heijden et al, "Mycorrhizal fungal diversity determines plant biodiversity, ecosystem variability and productivity," Nature 396: 69-72, 1998 (5 November).

residence times in the soil, adsorption characteristics, etc. Without likelihood estimates for each of these eventualities the risk assessment is virtually devoid of policy significance. CET-9 CON.

For instance, stating without documentation that sulfometuron methyl "does not tend to bioaccumulate" (at 3.14-14) is insufficient. Such a declaration must be accompanied by factual data (e.g., an octanol/water partition coefficient) or actual field studies to demonstrate this supposition.

Overall, the existing toxicity of herbicides section is selectively reported and biased towards non-effect determinations. By omitting consideration of non-target species, calculations of risks of "takings" of endangered species by the proposed activities, and the critical data a toxicologist would need to determine if hazards exist to specific wildlife species or humans (especially workers), the aggregate report provides an inadequate data base for policy formulation. Because of these deficiencies, the proposed risk assessment and evaluation of the sustained yield plan are incomplete and inadequate to form a basis for a negative declaration.

Marc Lappe, PhD

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CURRICULUM VITAE

March 1998

NAME: Marc Alan Lappé
ADDRESS: 47910 Signal Port Road, Gualala, California 95445
DATE OF BIRTH: January 14, 1943
PLACE OF BIRTH: Irvington, New Jersey
PHONE: 707/884-1846
SOC. SEC. NUMBER: 140-34-7851

EDUCATION

B.A.	Biology	Wesleyan University	1964
Ph.D.	Experimental Pathology	University of Pennsylvania	1968

HONORS AND AWARDS

1960-1964	Warner-Chilcott Scholar
1964-1966	NIH Trainee
1968-1970	Anna Fuller Fund Fellow
1968-1970	Honorary Postdoctoral Fellow University of California
1975-Present	Member, Bioethics Advisory Committee, National Foundation, March of Dimes
1979-Present	Fellow, Hastings Institute of Society, Ethics and Life Sciences
1981-1985	Sustained Development Award, National Science Foundation/National Endowment for the Humanities
1997-	Diplomate, American College of Forensic Examiners

BOARDS

1983-Present	Board of Advisors, Committee for Genetic Responsibility
1988-1991	Board of Directors, Health & Medicine Policy Group, Chicago
1989-Present	Editorial Advisory Board, Citizens Clearing House for Hazardous Wastes, Arlington, Virginia
1996-1999	Board of Directors, Hemispheres/Natural Food Associates, Atlanta, Texas
1997-Present	Board of Directors, Redwood Coast Medical Services
1998-Present	Board of Directors, Mendocino Cancer Resource Center

GRANTS

1972-1975	Principal Investigator, "Societal, Legal and Ethical Issues of Genetic Knowledge", National Institutes of Health
1986	Principal Investigator, Genetics and Society, GTE Lecture Series Grant
1989	Principal Investigator, "Parental Exposure to Toxic Substances and Birth Outcomes", March of Dimes
1991-1992	Principal Investigator, "Justice and the Human Genome", U.S. Department of Energy
1996-1997	Consultant for Toxicology and Policy, "Hypermedia Application for Health Promotion in the Workplace", National Institutes of Health

HOUSE AND SENATE TESTIMONY (Washington, D.C.)

1977 September 7 Testimony before House Subcommittee on Science and Technology, Recombinant DNA Research and Public Health

November 2 Testimony on Freedom and Responsibility in Science before Senate Commerce Committee

1982 November 18 Testimony (submitted by invitation) to House Subcommittee on Science and Technology on Ethics of Developing Treatment for Human Genetic Disease

1985 December 18 Testimony on Biotechnology and Government Policy, Subcommittee on Oversight & Investigations, Senate Commerce and Energy Committee

1988 November 22 Testimony on Disclosure and Informed Consent before the Panel on Medical Devices, Food and Drug Administration

1991 June 11 Testimony on Adequacy of Safety Testing of Injectable Silicone, Human Resources & Intergovernmental Relations Subcommittee of the Committee on Government Operations, House of Representatives

1992 June 4 Testimony on Health Policy Issues Surrounding the Development of Dental Prosthetic Devices, Human Resources & Intergovernmental Relations Subcommittee of the Committee on Government Operations, House of Representatives

ORGANIZATIONS

American Association for the Advancement of Science
American Public Health Association
American Chemical Society
American Society for Bioethics and Humanities
Hastings Center Fellow
National Environmental Health Association
New York Academy of Science
Scientific Advisory Committee to Mothers and Others
Society of Environmental Toxicology and Chemistry
Society of Toxicology

PUBLICATIONS Cont'd

15. Lappé, M.A. "Evidence for immunological surveillance during skin carcinogenesis: Inflammatory foci in immunologically competent mice," Israel J. Med. Sci. 7:52-65, 1970.

16. Blair, P.B., Kripke, M., Lappé, M.A., Bonhag, R.S. and Young, L. "Immunologic deficiency associated with mammary tumor virus infection. Hemagglutinin production and allograft response," J. Immunol. 106:364-70, 1971.

17. Lappé, M.A. "Genetic Control," N. Eng. J. Med. 286:49-50, 1971 (letter to the editor).

18. Lappé, M.A. and Schalk, J. "Necessity of the spleen for balanced secondary sex ratios following maternal immunization with male antigen," Transplantation 11:491-495, 1971.

19. Lappé, M.A. "The genetic counselor: Responsible to whom?" Hastings Center Report 2:2, 1971.

20. Prehn, R.T. and Lappé, M.A. "An Immunostimulation theory of tumor development," Transplantation Review 7:26-54, 1971.

21. Lappé, M.A. "Risk-taking for the unborn," Hastings Center Report 1:2-4, 1972.

22. Lappé, M.A., Gustafson, J.M., Roblin, R., et al "Ethical and social issues in screening for genetic disease," N. Eng. J. Med. 286:1129-1132, 1972.

23. Lappé, M.A. "Moral obligations and the fallacies of genetic control," Theological Studies 33:411-427, 1972.

24. Lappé, M.A. "The possible significance of immunological recognition of preneoplastic and neoplastic cell surfaces," National Cancer Institute Monographs 35:49-55, 1972.

25. Hecht, S. and Lappé, M., "Moratorium on human zygote implantation," N. Eng. J. Med., 287(13):672, September 1972 (letter).

26. Lappé, M.A. "Mass genetic screening programs and human values: Another view," Med. Dimensions 2:2, 1973.

27. Lappé, M.A. "Allegiances of human geneticists: A preliminary typology," Hastings Center Studies 1:2, 1973.

28. Lappé, M.A. "Human Genetics," In: Public policy toward the environment: A review and appraisal, Ann. N. Y. Acad. of Sci. 216:152, 1973.

29. Lappé, M.A. "Genetic knowledge and the concept of health," Hastings Center Report 3:4, 1973.

PUBLICATIONS Cont'd

47. Lappé, M.A. "Abortion and fetal research: A reconsideration," In: Encyclopaedia Britannica Year Book, 1975.

48. Lappé, M.A. "Reflections on the non-neutrality of hypothesis formulation," Clinical Research 24:56-63, 1976.

49. Lappé, M.A. "Reflections on the cost of doing science," Annals of the New York Academy of Sciences 265:102-111, January 23, 1976.

50. Lappé, M.A. "What's in the genes anyway?" Man and Medicine 5:268-272, 1976.

51. Lappé, M.A. and Brody, J.A. "Genetic counseling: A psychotherapeutic approach to autonomy in decision-making," Psychiatry and Genetics, M.A. Sperber and L.F. Jarvik (eds.), Basic Books (New York, 1976).

52. Lappé, M.A. "The perils of knitting new life," American Biology Teacher 39:200-206, 1977.

53. Lappé, M.A. and Morrison, R. (eds.), "Ethical and scientific issues posed by human uses of molecular genetics," Annals of the New York Academy of Sciences Volume 265, 1976.

54. Lappé, M.A. Statement before the Subcommittee on Science, Research and Technology, September 7, 1977, In: Science Policy Implications of DNA Recombinant Molecule Research, U.S. Gov. Printing Office (93-481) Pub. No. 24 of the Committee on Science and Technology, Washing, 1977), pp. 1011-1043.

55. Lappé, M.A. "Genetic engineering: Science Fiction or Science Fact?" In: Redesigning Man: In Search of an Ethic, T.W. Hogan (ed.), Chaminade University Press (Honolulu, 1977).

56. Lappé, M.A. "Pulling back from the apocalypse," Man and Medicine 2:120, Winter 1977.

57. Lappé, M.A. "Genetic screening," In: Principles of Counseling, T. Hsia (ed.), Alan R. Liss, Inc. (New York, 1978).

58. Lappé, M.A. and Archibold, P. "The place of the public in the conduct of science," University of Southern California Law Review 51:1539-1554, 1978.

59. Lappé, M.A. "Dying while living: A critique of allowing to die legislation," Journal of Medical Ethics 4:111-116, 1978.

60. Lappé, M.A. "Theories of genetic causation in human disease," In: Genetic Counseling: Facts, Values and Norms, Plenum Press (New York, 1978).

61. Lappé, M.A. "Genetics and our obligations to the future," In: Bioethics and Human Rights, E. & E. Bandman, Little, Brown & Co. (1978), pp. 84-93.

PUBLICATIONS Cont'd

79. Lappé, M.A. "Ethical issues generated by testing for genetic susceptibility to occupational hazards or monitoring for their mutagenic effects," invited background review article, Office of Technology Assessment, 1983.

80. Lappé, M.A. "Genetic disease: Diagnosis and treatment," In: Proceedings of the Fifth Arnold O. Beckman Conference in Clinical Chemistry, A.A. Dietz (ed.), (Washington, D.C., 1983), pp. 282-296.

81. Lappé, M.A. (editor and co-author) Published Reports from the Hazard Evaluation System and Information System, California Department of Health Services, 1979-1982.

82. Lappé, M.A. (editor and co-author) Trichloroethylene (TCE): Evaluation of the Human Health Effects, California Department of Health Services and Department of Industrial Relations, April 18, 1980.

83. Lappé, M.A. (editor and co-author) 2, 4-Dichlorophenoxyacetic Acid (2, 4-D): Evaluation of the Human Health Effects, California Department of Health Services and Department of Industrial Relations, June 16, 1980.

84. Lappé, M.A. (editor and co-author) Potential Health Hazards Associated with the Use of Plastic Pipe in Potable Water Systems, California Department of Health Services and Department of Industrial Relations, October 17, 1980.

85. Lappé, M.A. (editor and co-author) The Toxicology of PCB's: An Overview with Emphasis on Human Health Effects and Occupational Exposure, California Department of Health and Department of Industrial Relations, January 1981.

86. Lappé, M.A. "Potential reproductive risks posed by maternal exposure to photographic chemicals," Journal Birth: Issues in Perinatal Care and Education 10:173-177, 1983.

87. Lappé, M.A. "Values and public health: Value considerations in setting health policy," Theoretical Medicine 4:1-10, 1983.

88. Lappé, M.A. "Ethical issues in testing for differential sensitivity to occupational hazards," Journal of Occupational Medicine 25:797-801, 1983.

PUBLICATIONS Cont'd

105. Lappé, M.A. "Long range implications of mapping and sequencing the human genome: Ethical and philosophical implications," Mapping Our Genes, Contractor Reports, Vol. 1, Office of Technology Assessment, U.S. Congress, 70 pp., 1988.

106. Lappé, M.A. "Ethics, maternal and child health," In: Making Change Happen: Action Strategies, DHHS Region V Second Annual Maternal and Child Health Conference, Univ. of Illinois Press, (Chicago, 1988), pp. 81-86.

107. Lappé, M.A. "Commentary" on Crane et al. "Environmental exposures in cytogenetically defined subsets of acute non-lymphocytic leukemia," JAMA 262: 634-639, 1989, In: Environmental Health Monthly 2: 9-10, 1990.

108. Lappé, M.A. "Genetic neuroscience and biotechnology," Hastings Center Reports, Nov/Dec 1990, pp 21-22.

109. Lappé, M.A. "Ethical considerations of fear of cancer following toxic substance exposure," Proceedings of the Fourth National Environmental Health Conference, Agency for Toxic Substance Disease Registry, Center for Disease Control, Government Printing Office, Washington, D. C., 1990.

110. Lappé, M.A. **Chemical Deception: Exposing the Toxic Threat to Public Health and the Environment**, Sierra Club Books, (San Francisco, CA, 1991).

111. Lappé, M.A. "Ethical issues in manipulating the human germ line, Journal of Medicine and Philosophy 16: 621-639, 1991.

112. Lappé, M.A. "Eugenics" In: Encyclopedia of Bioethics, Warren T. Reich (ed.), Macmillan Pub. Co., (New York, 1992).

113. Lappé, M.A. "Risks and the ethics of genetic choice," In: Prescribing Our Future, Ethical Challenges of Genetic Counseling, D.M. Bartels, B.S. LeRoy and A.L. Caplan (eds.), Aldine de Gruyter Press, (Hawthorne, NY, 1993).

114. Lappé, M.A. "Justice and the genome," National Forum, Spring 1993.

115. Lappé, M.A. "Silicone-reactive disorder: A new autoimmune disease caused by immunostimulation and super antigens," Medical Hypotheses, October 1993.

116. Wolf, L.E., Lappé, M.A., Peterson, R.D. & Ezrailson, E.G., "Human immune response to polydimethy/siloxane (silicone): Screening studies in a breast implant population," FASEB Journal 7: 1265-1268, 1993.

117. Lappé, M.A. and Murphy, T. F. (editors), **Justice and the Human Genome Project**, University of California Press, (Los Angeles, 1994).

118. Lappé, M.A. "Justice and the limitation of genetic knowledge," In: Justice and the Human Genome Project, op. cit., 1994.